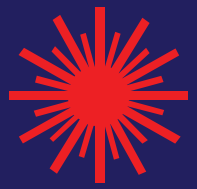
Laser Safety Audits Of Research Labs



Johnny Jones

Laser-Professionals Inc.

Planning the Audit

- Write an objective statement.
- Create a data form that meets your needs.
- Ask all personnel about training.
- Make sketches of labs; take photos.
- Train audit team?

OPEN BEAM CONTROL MEASURES

ANSI Section 4.3.1.1

- Training
- Beam Control
- Laser Safety Eyewear
- Written Procedures
- Laser Controlled Area

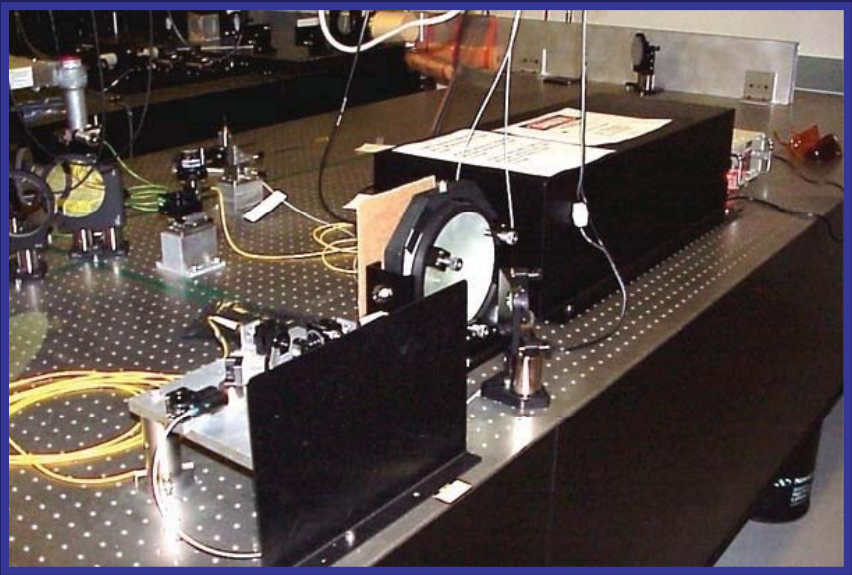
First Question for the LSO: Have Training Requirements Been Met?

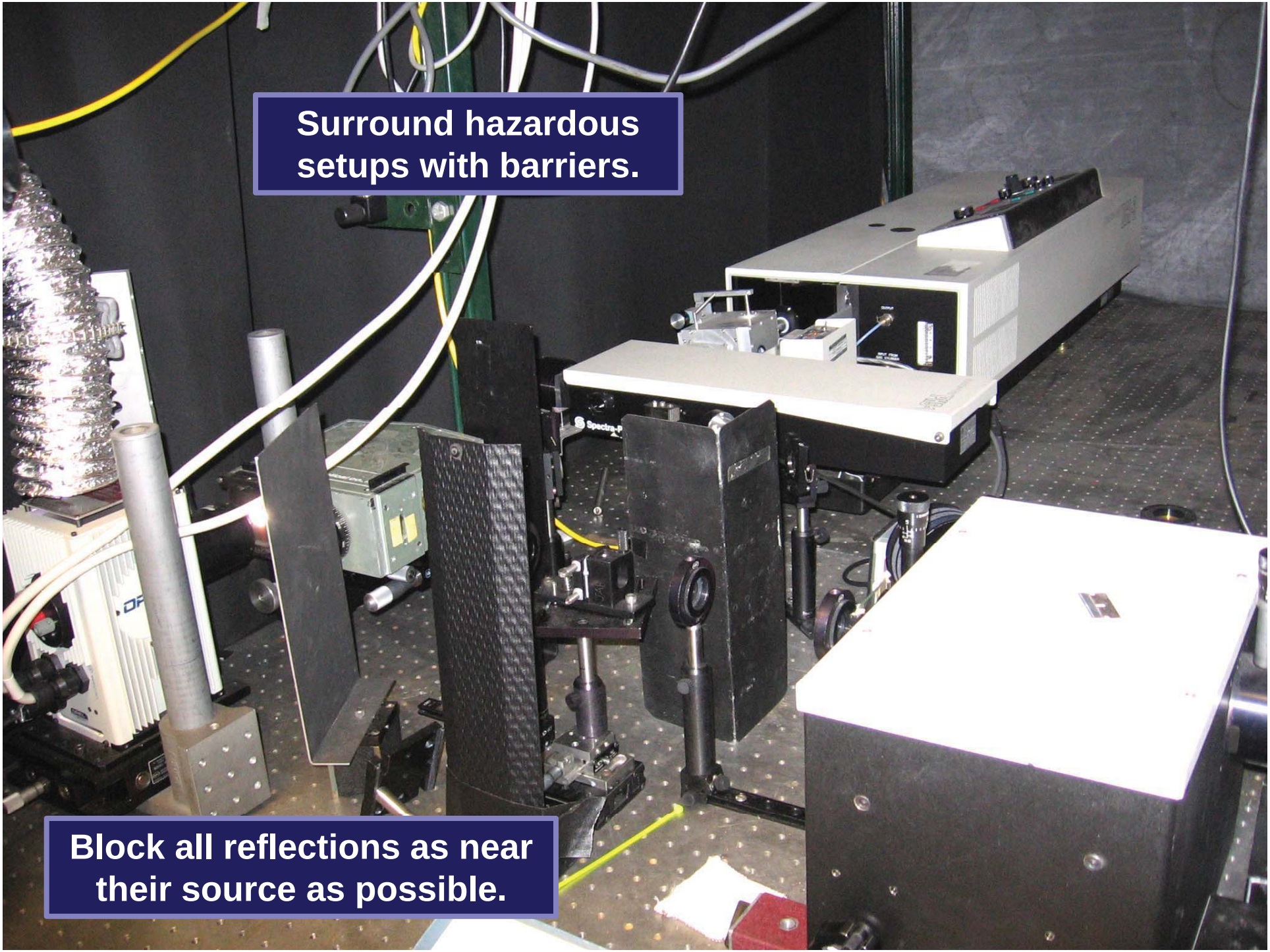
- Review Laser Safety Officer training.
- Review training records for laser personnel.
- Ask all personnel about training.

First Question In Every Lab: Where is the greatest hazard?

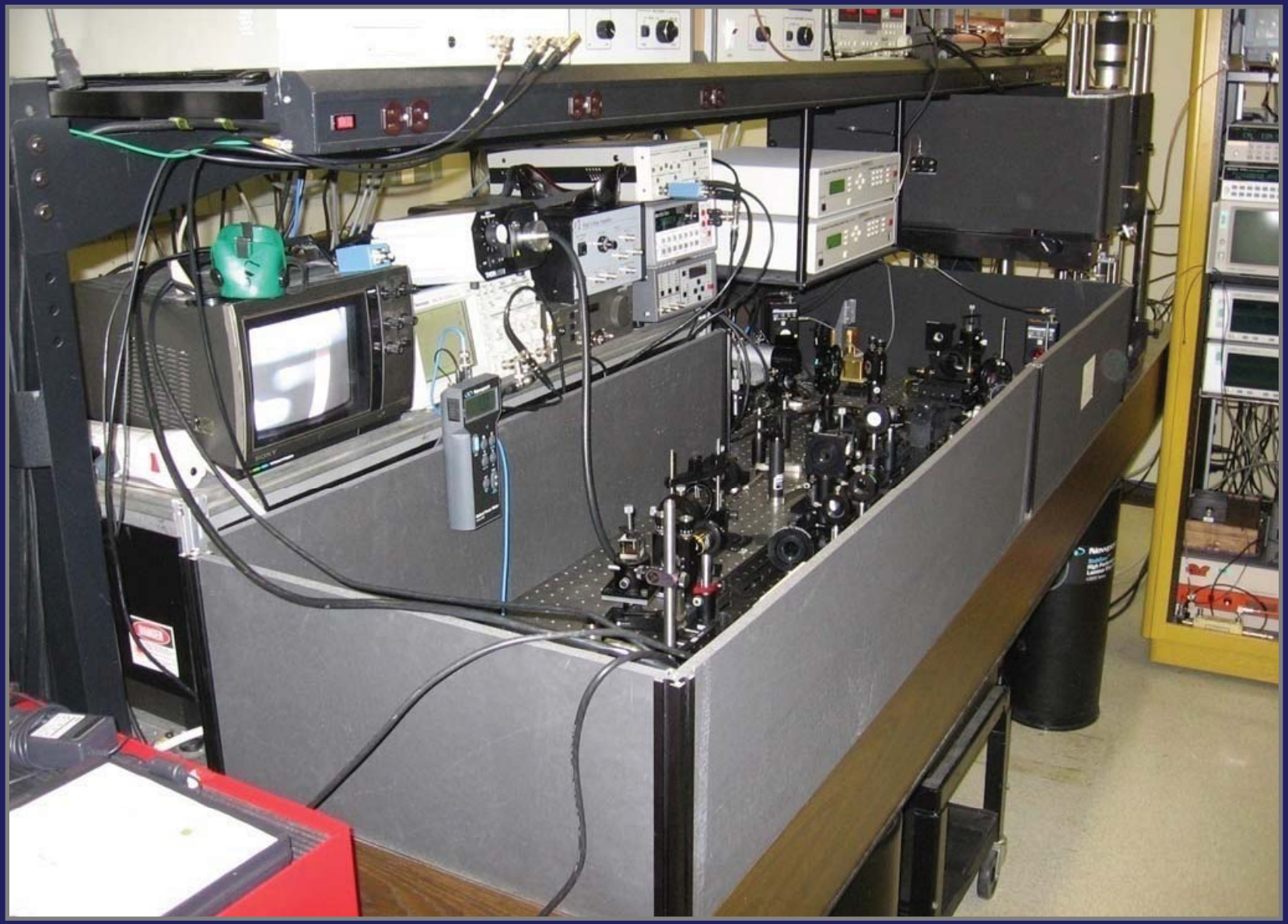
- Ignore entryway and interlocks in the beginning.
- Ask laser personnel to explain the setup, the hazards, and the controls.
- Review Written Procedures and SOPs.
- Evaluate Beam Control.
- Ask what could go wrong?

EXAMPLES OF GOOD BEAM CONTROL

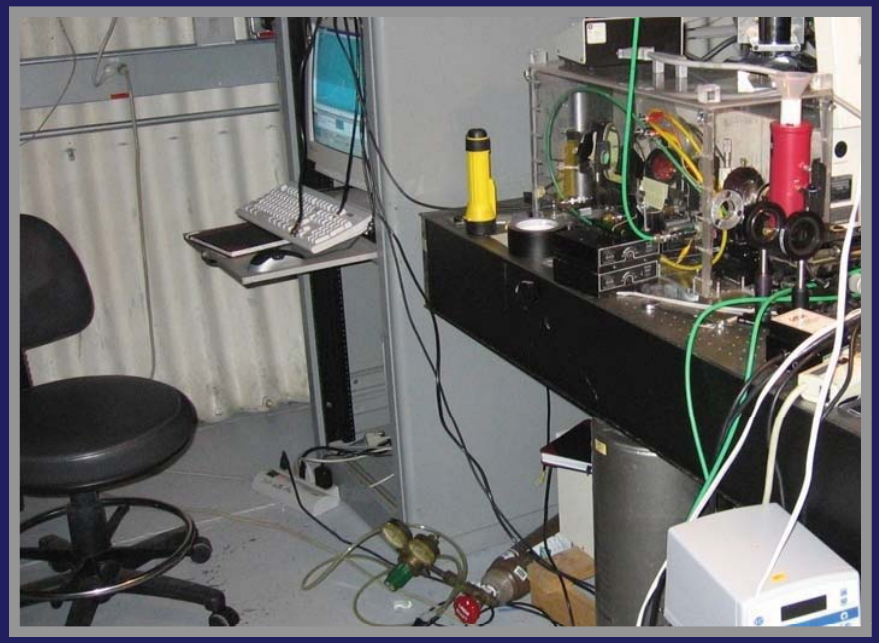



Surround hazardous setups with barriers.
Block all reflections as near their source as possible.

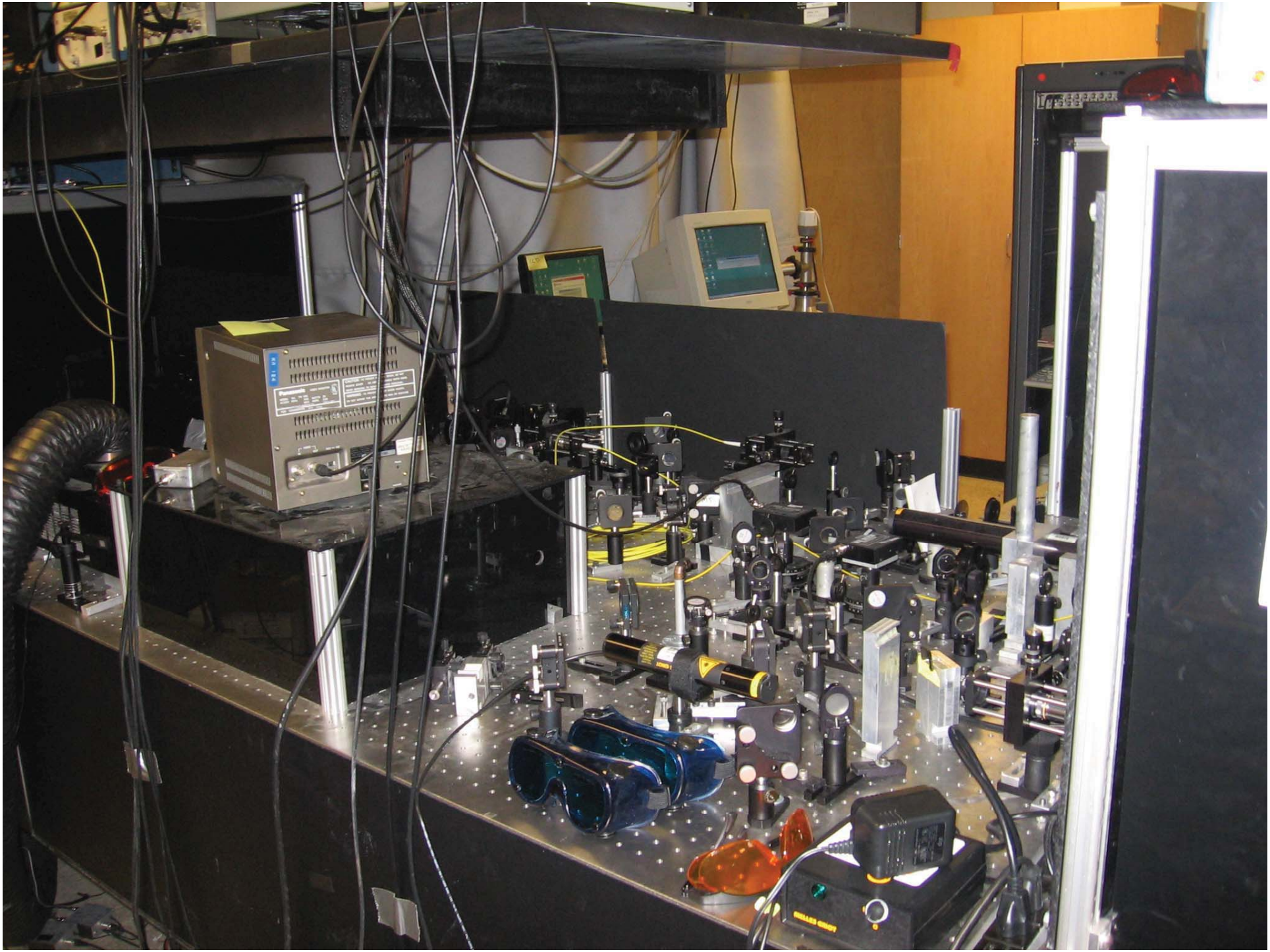
CURBS ON OPTICAL TABLE

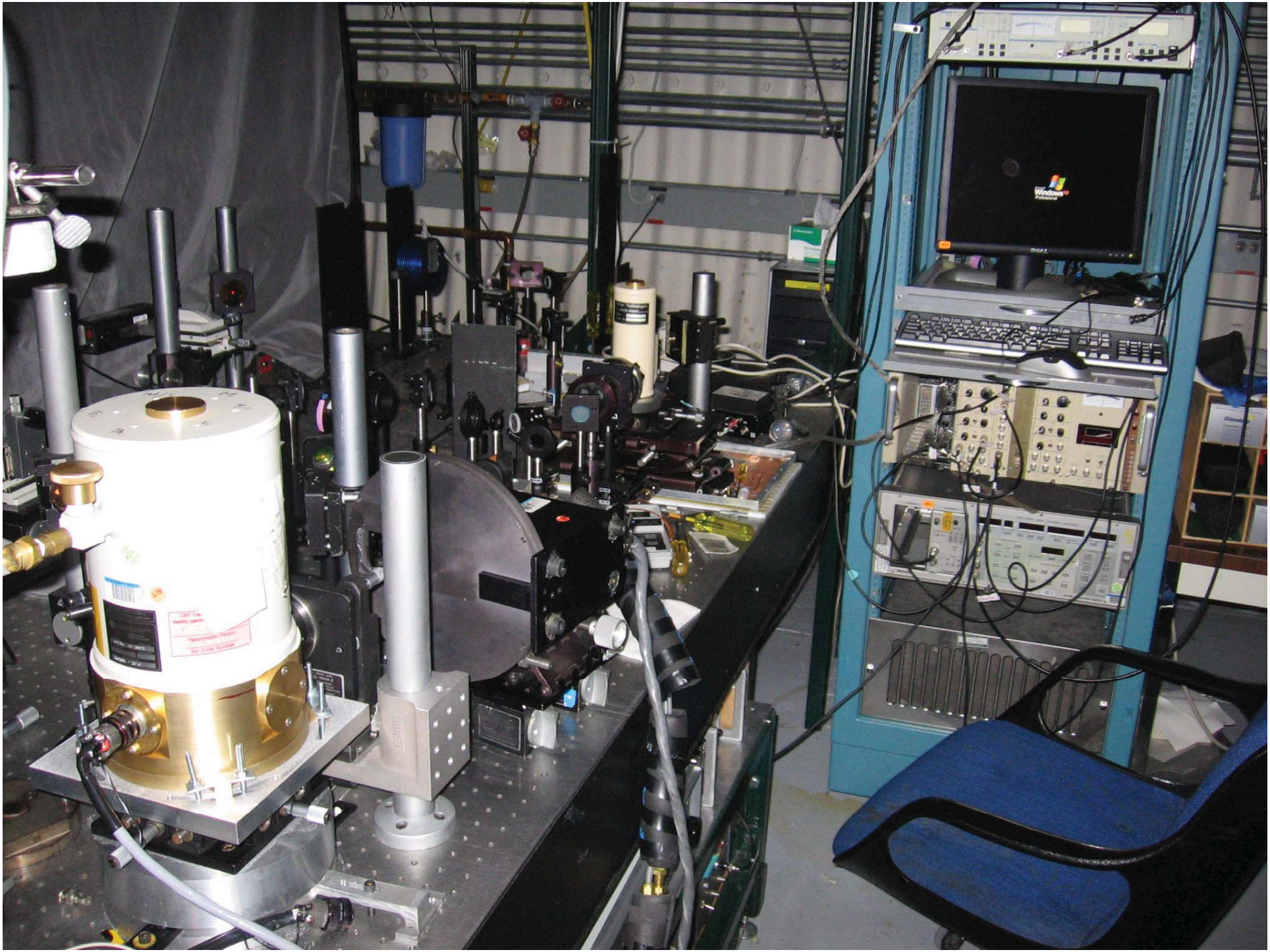


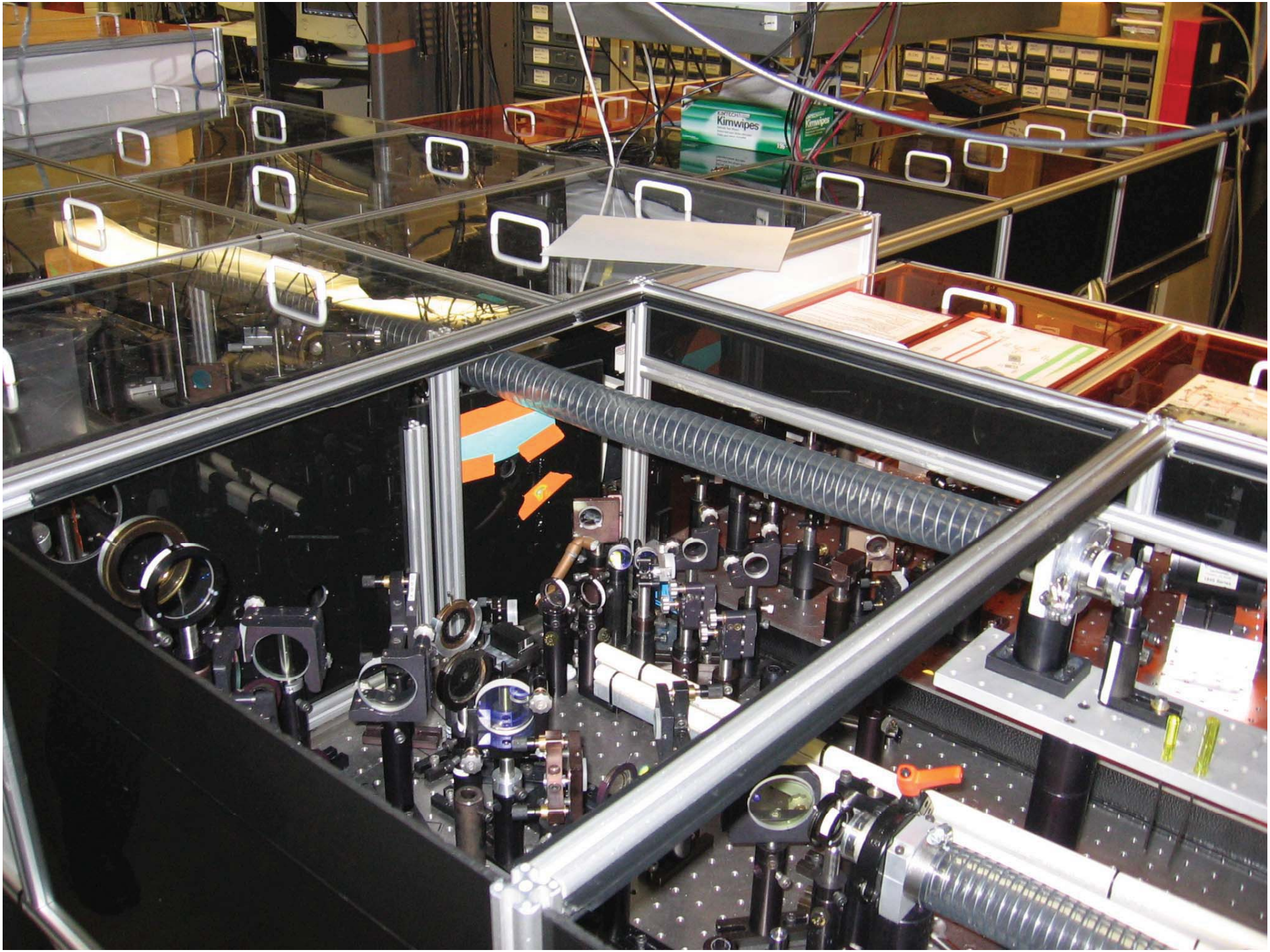
COMPUTERS IN RESEARCH LABS

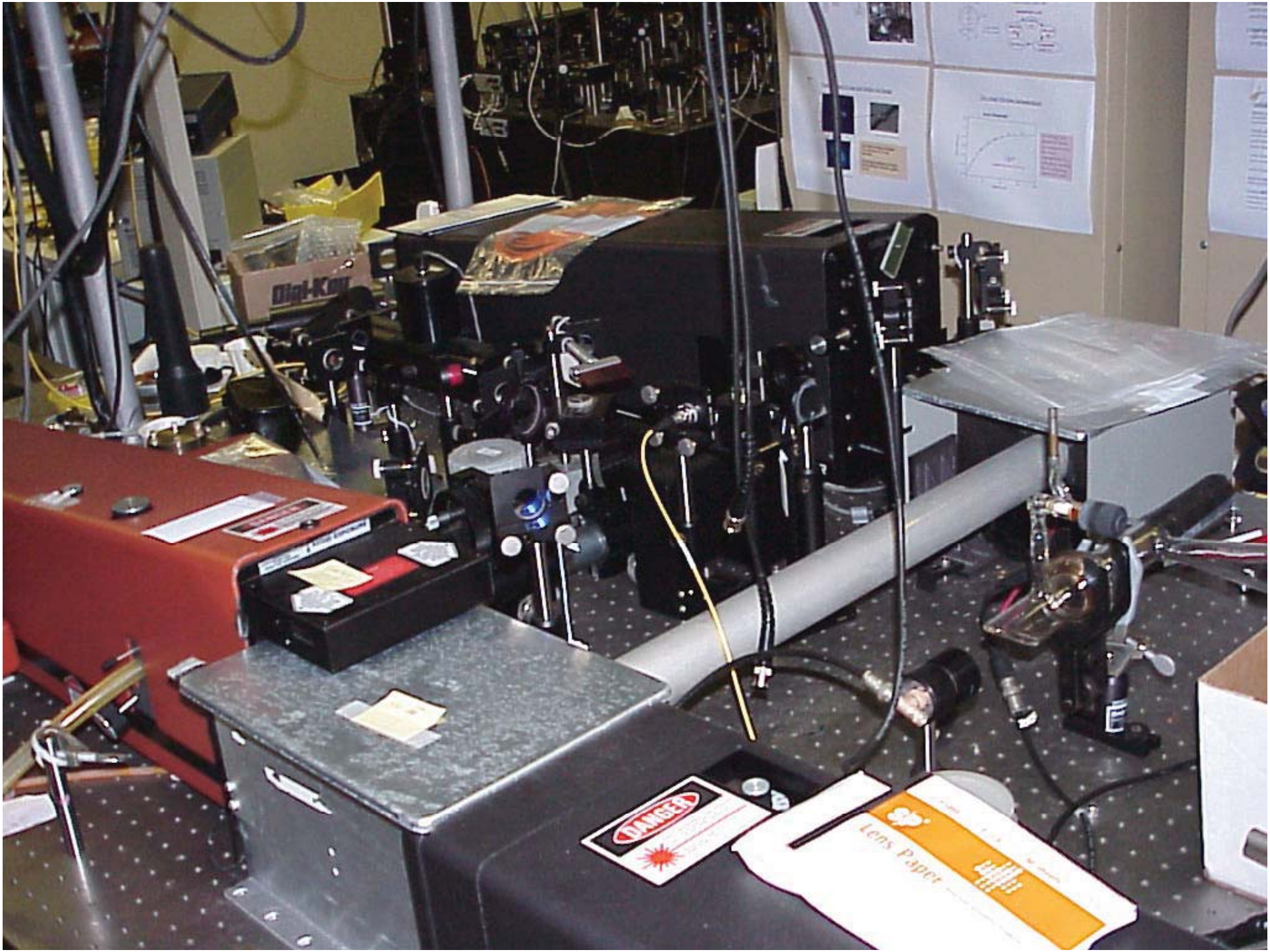


Allowing a direct view from a computer workstation into a laser experimental setup increases the risk of eye exposure to reflected beams.

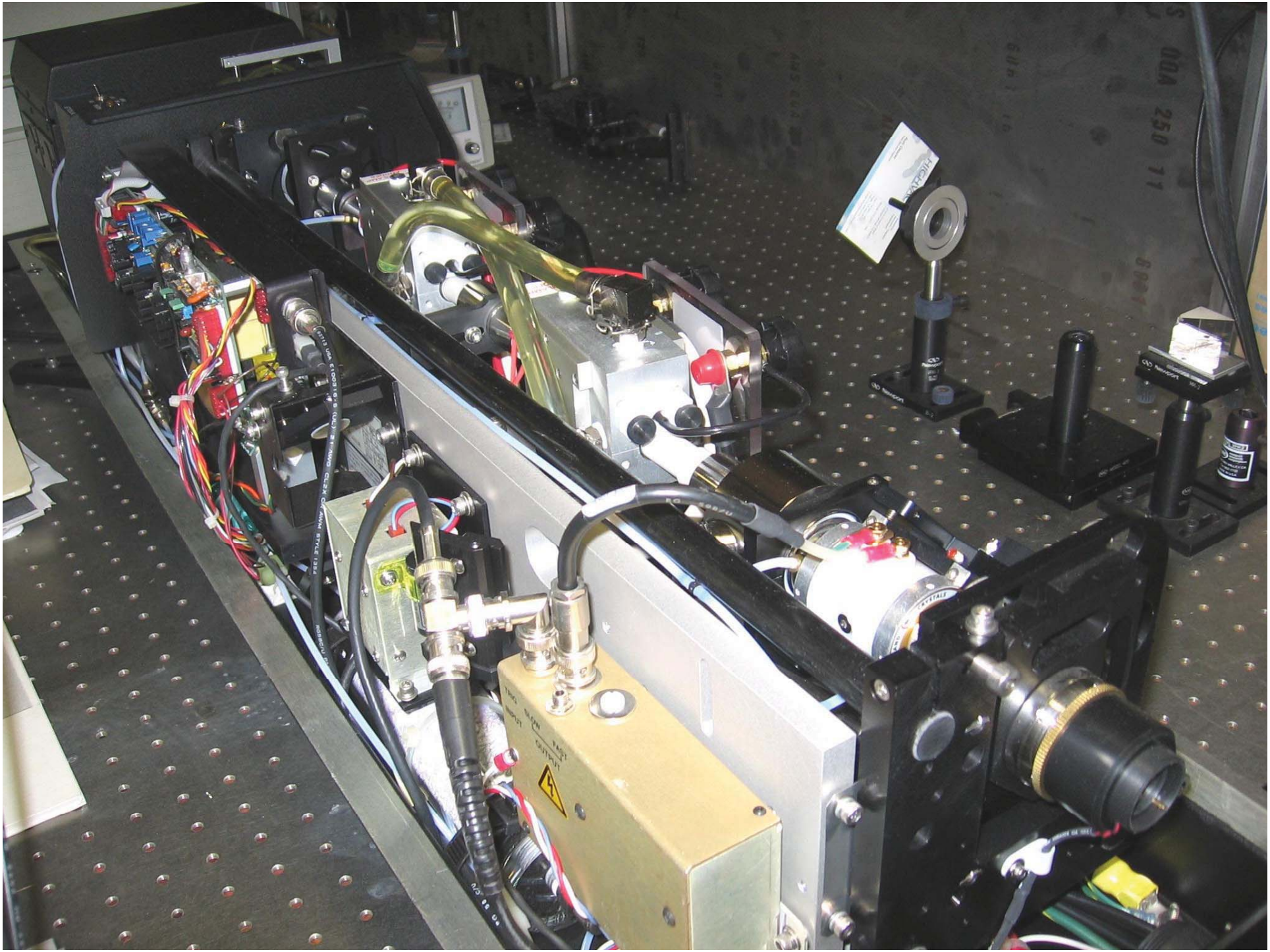




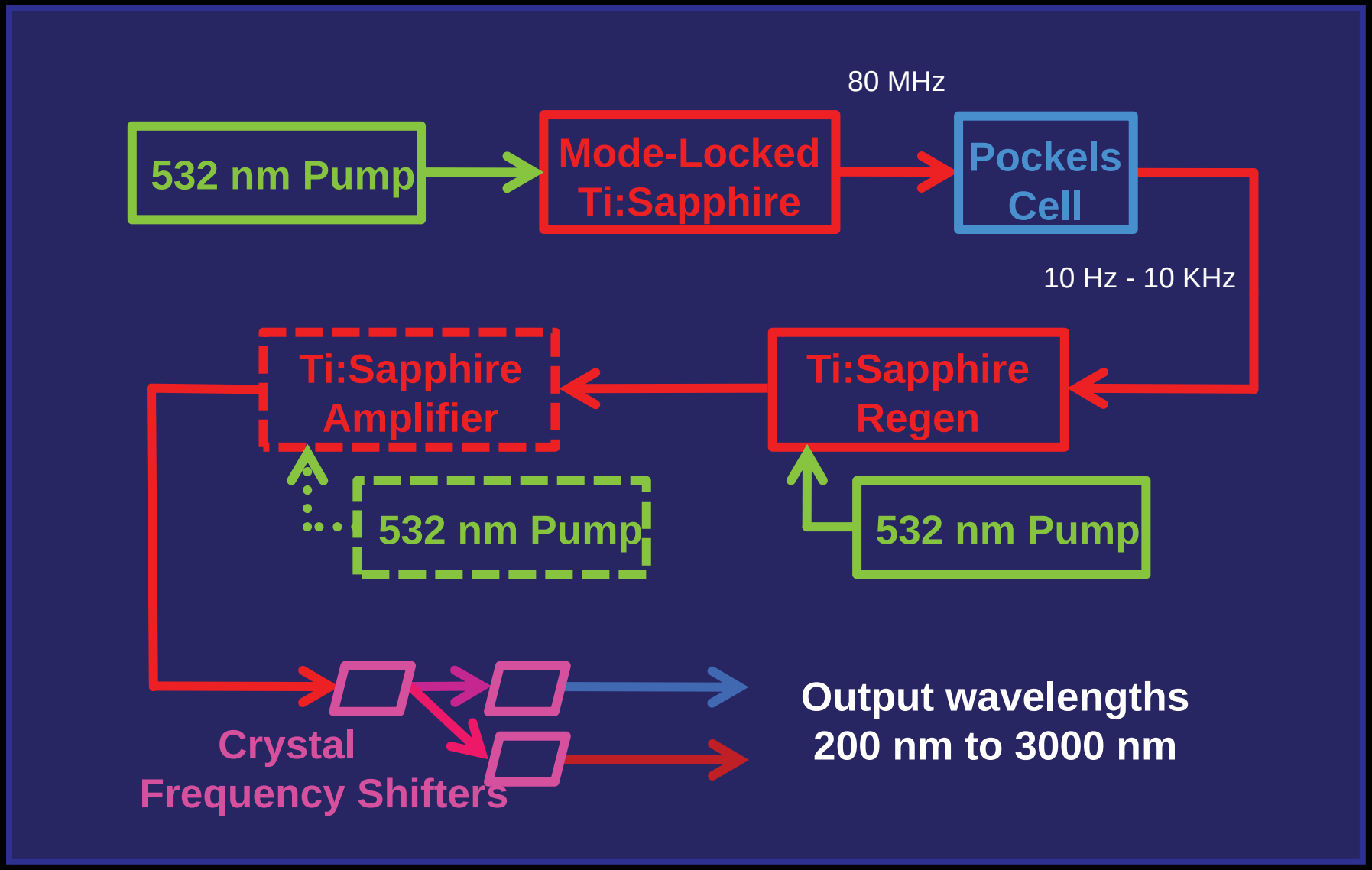

Kimwipes


DANGER
Lens Paper


GCR-11
WARNING
LABORATORY
FILM
Kimwipe



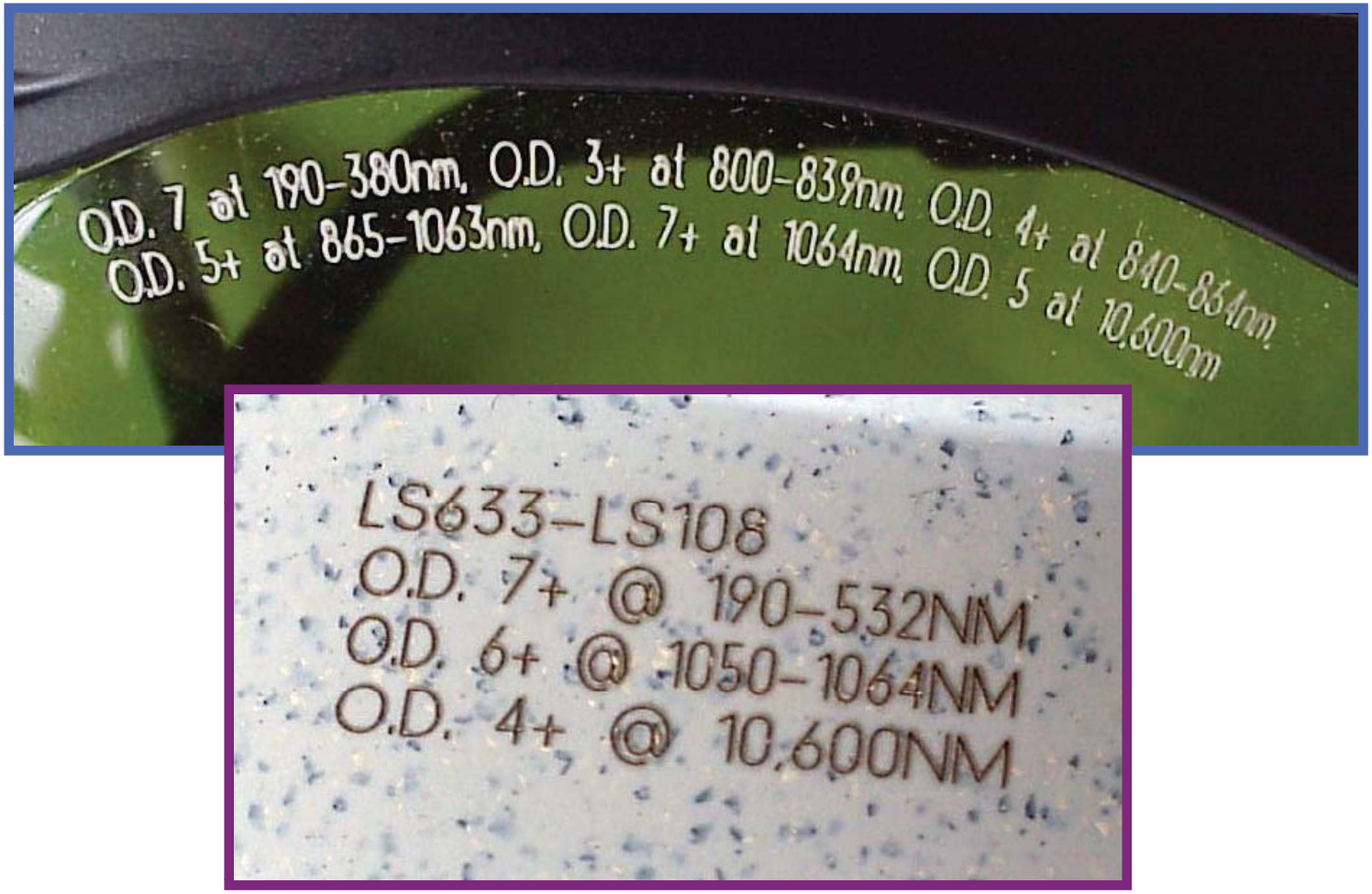
TUNABLE ULTRASHORT PULSE SYSTEM



TI:SAPPHIRE ULTRASHORT PULSE SYSTEM

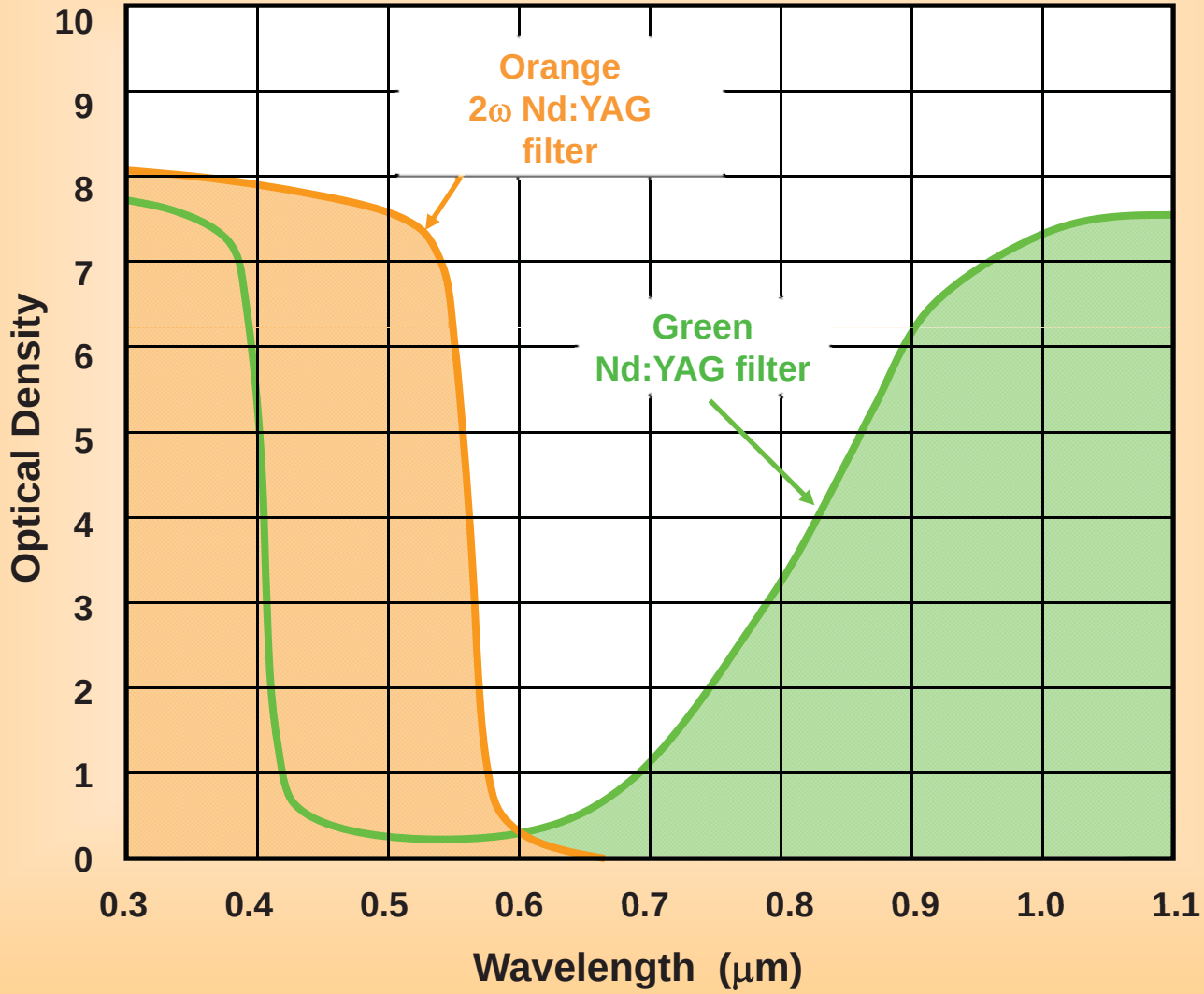
LASER SAFETY EYEWEAR

EYEWEAR LABELS

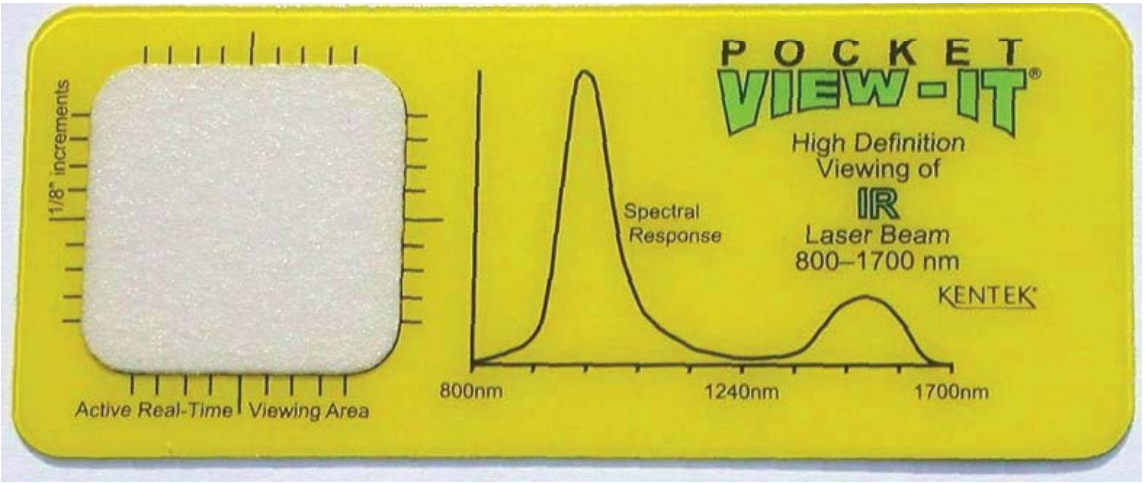


All eyewear must be labeled!

PLASTIC EYEWEAR CHARACTERISTICS



BEAM VIEWING DEVICES



Photos courtesy of KENTEK® "Laser People Helping Laser People"®

WHO HAS PRIMARY RESPONSIBLITY FOR LASER SAFETY ANY TIME A CLASS 3B OR CLASS 4 LASER IS OPERATED?

The person operating the laser always has the primary responsibility for all hazards associated with laser use.

Ask About Hazards During Alignment

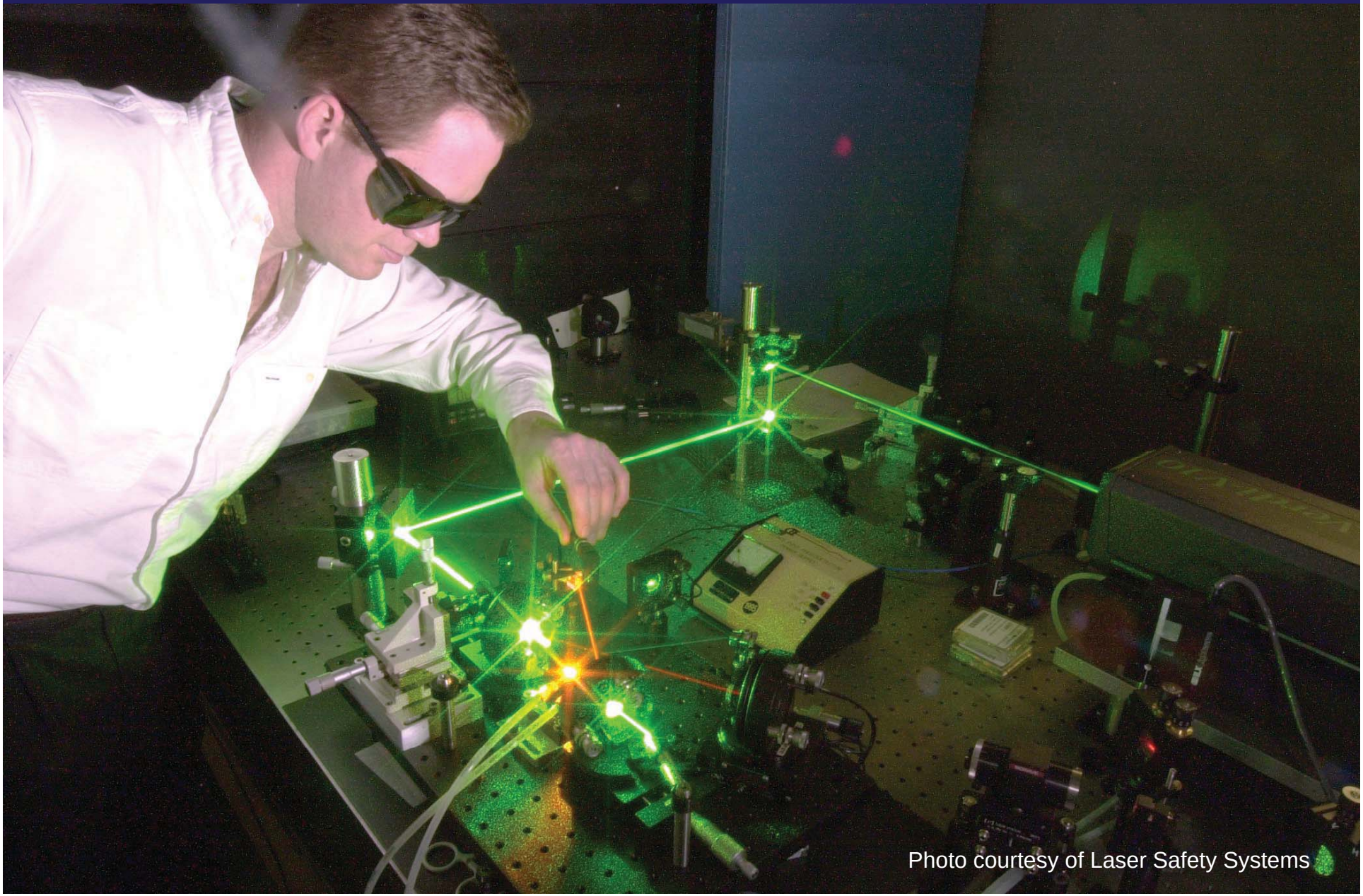
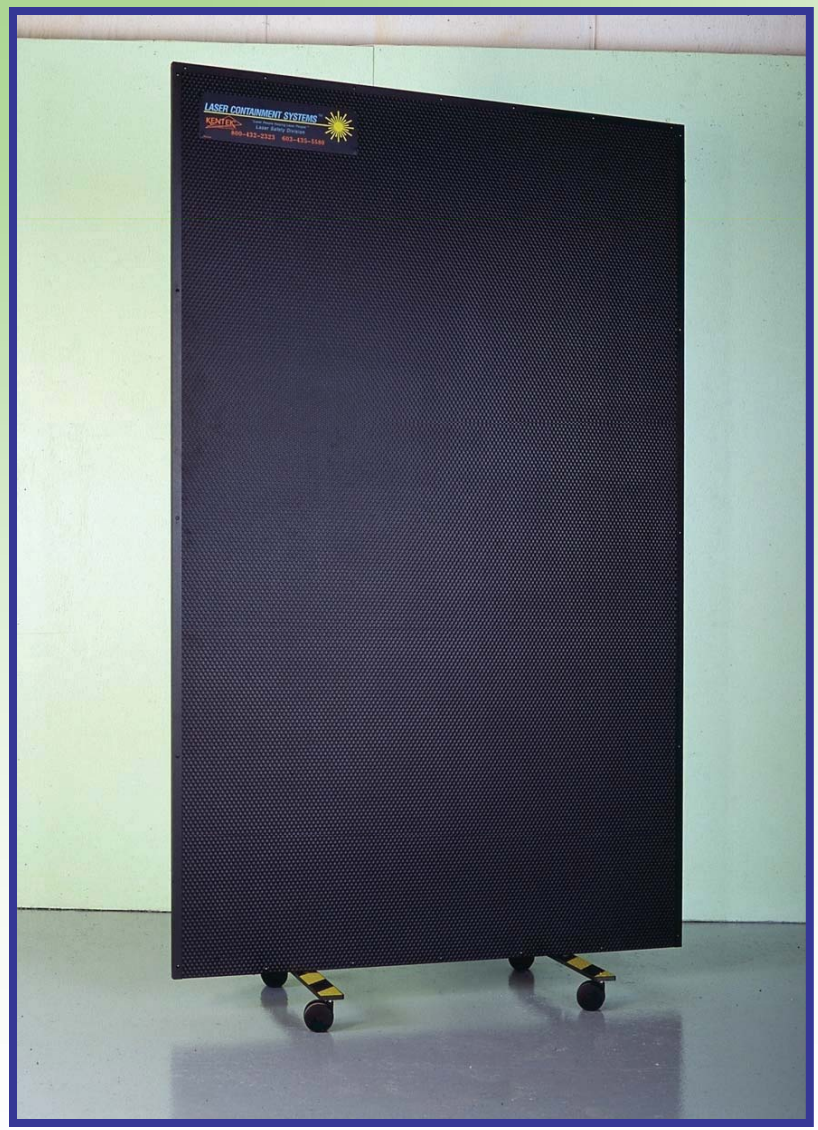


Photo courtesy of Laser Safety Systems

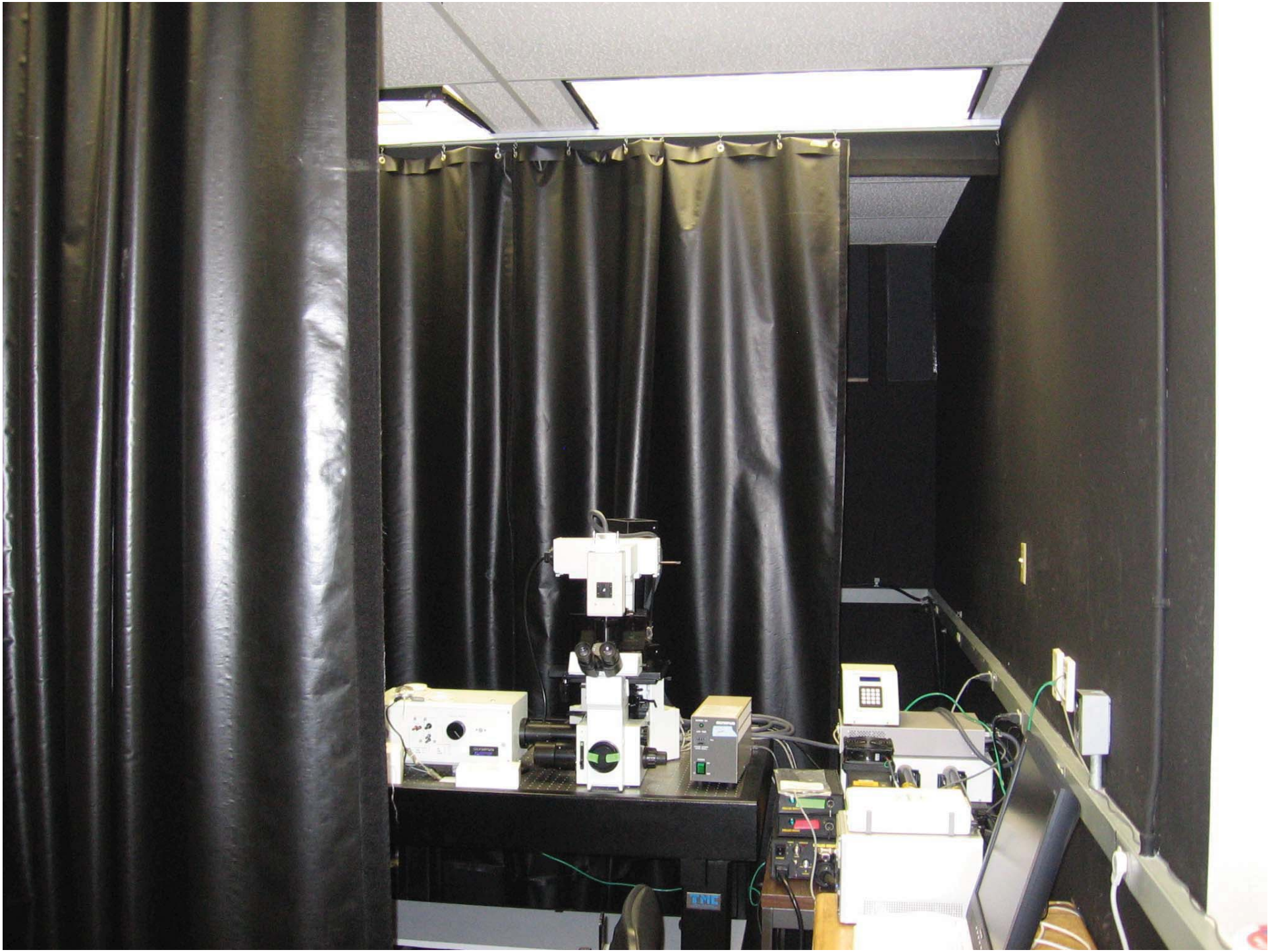
SAFE BEAM ALIGNMENT

- **Most beam injuries occur during ali gnment.**
- **Only trained personnel may align class 3B or class 4 lasers *(NO EXCEPTIONS!)***
- **Laser safety eyewear is required for class 3B and class 4 beam alignment.**
- **ANSI *REQUIRES* approved, written alignment procedures for *ALL* class 4 laser alignment activities and recommends them for class 3B.**

LASER PROTECTIVE BARRIERS



Photos courtesy of KENTEK® "Laser People Helping Laser People"®



CLASS 4 ENTRYWAY CONTROLS

Section 4.3.10.2.2

1. ***Non-Defeatable Entryway Controls***
   - **Doorway interlock is non-defeatable**
   - **Training of authorized users only**

2. ***Defeatable Entryway Controls***
   - **Doorway interlock is defeatable**
   - **Training of all personnel with access**
   - **Barrier and eyewear at door**

3. ***Procedural Entryway Controls***
   - **No doorway interlock**
   - **Training of all personnel with access**
   - **Barrier and eyewear at door**
   - **Visible or audible signal at doorway**


DANGER
VISIBLE AND
INVISIBLE LASER
PROTECT EYES & SKIN
ENTRY REQUIREMENTS
DANGER
No hazard at entryway

LABORATORY DOOR INTERLOCK

ENTRYWAY WARNING LIGHTS

DANGER

VISIBLE and/ or INVISIBLE LASER RADIATION-AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

ND:YAG 1064 nm
100 Watts Max. Average Power
Eyewear Required: OD $\geq$ 5 @ 1064 nm

CLASS 4 LASER

Controlled Area Warning Sign

Finish the Audit

- Send an audit report to all laser owners.
- Write a final audit report.
- Recommend improvements.

LASER PROFESSIONALS INC.

LPI

Experience Makes the Difference